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HISTORICAL FUND
of the
NAVY MEDICAL DEPARTMENT

A committee has been formed with representation from the Medical Corps, Dental Corps, Medical Service Corps, Nurse Corps, and Hospital Corps for the purpose of creating a fund to be used for the collection and maintenance of items of historical interest to the Medical Department. Such items will include, but will not be limited to, portraits, memorials, etc., designed to perpetuate the memory of distinguished members of the Navy Medical Department. These memorials will be displayed in the Bureau of Medicine and Surgery and at the National Naval Medical Center. Medical Department officers, active and inactive, are invited to make small contributions to the fund. It is emphasized that all donations must be on a strictly voluntary basis. Funds received will be deposited in a Washington, D. C. bank to the credit of the Navy Medical Department Historical Fund, and will be expended only as approved by the Committee or its successor and for the objectives stated.

It is anticipated that an historical committee will be organized at each of our medical activities. If you desire to contribute, please do so through your local historical committee or send your check direct, payable to Navy Medical Department Historical Fund, and mail to:

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Drugs for Treatment of Hypertension

Since 1950, a number of new antihypertensive drugs have come into use and have helped to change not only the clinical management, but also the basic concepts of essential hypertension. These drugs have in common only their antihypertensive property and even this is mediated differently by each of them. The ganglionic blocking drugs reduce the activity of the sympathetic nervous system, the veratrum products stimulate the depressor activity of the parasympathetic nervous system, the Rauwolfia derivatives lessen the pressor effects of central nervous agitation, hydralazine dilates the arteriolar system—particularly in the kidney—and chlorothiazide augments natruresis and may decrease renal pressor activity. Each of these drugs has a place in the treatment of different patients and several or even all of them may be used in combination in certain cases. This report gives a resume of the present status of these new agents not only as to their beneficial actions, but also as to their undesirable side effects and draws some inferences concerning the physiologic mechanisms that may be operating in arterial hypertension.

Rauwolfia, the mildest of the hypertensive drugs has definite central sedative or "tranquilizing" effects. These are thought possibly to be related to the depleting effect of reserpine upon the brain's content of serotonin, the catecholamines, or both. This depleting effect of reserpine might account for the well established clinical observation that on long-term continued use, the doses of Rauwolfia that can be tolerated without serious mental depression may have to be reduced to a quarter or less of the initial dosage and often to as little as 0.1 mg. of reserpine a day.

Rauwolfia's main usefulness for long-term treatment is as a preparatory adjunctive agent to be given should there be need for stronger antihypertensive drugs, such as hydralazine. Because Rauwolfia slows the pulse rate and generally decreases "reactivity," it lessens the side effects of hydralazine, such as palpitation and headache. In addition, it appears to potentiate the hypotensive effect of hydralazine and, thereby, to lessen the size of dosages necessary to achieve a given lowering of blood pressure.

Hydralazine, in spite of producing serious side effects on occasion, is a useful antihypertensive drug, particularly in combination with Rauwolfia (or reserpine), with chlorothiazide, or with both. It dilates blood vessels generally (possibly in part through release of histamine) and acts especially to increase renal blood flow. When started on hydralazine in low dosages (i.e., 10 mg. four times a day), patients may become accommodated to it without suffering the undue postoccipital headache or palpitation which it usually causes when exhibited at first in the ordinary full dosage.

Veratrum is a potent hypotensive drug, but on long-term administration tends increasingly to cause nausea and vomiting with the result that it is likely to become less and less useful alone as a hypotensive agent.

However, in combination with Rauwolfia (e. g., Rauwiloid plus Veriloid), it is well tolerated, particularly in elderly persons with known or possible coronary disease.

Chlorothiazide is a new and interesting addition to the armamentarium against hypertension. A strong diuretic, effective orally, and essentially free of toxic effects, it is ideal for long-term usage. However, because it is a powerful saluretic agent, precautions are necessary in its continued administration because of its effects in depleting electrolytes, particularly upon the potassium stores of the body.

Antiserotonins. Because of the possibility that the antihypertensive effect of Rauwolfia or of reserpine is related to their depleting action on the body stores of serotonin and also because serotonin—as its name implies—is a strong vasoconstrictive agent, synthetic analogues of serotonin have been reproduced in the hope of finding one that would be an effective antagonist of "antimetabolite" of serotonin. The only one of these that has proved suitable for long-term clinical trial is the Benzyl Analogue of Serotonin. This agent, BAS, proved to be remarkably similar in its clinical effects to reserpine which it resembles chemically only in containing an indole nucleus.

Ganglionic blocking agents, like surgical splanchnicectomy are apparently slowly being relegated to a position of last resort, if not actual disuse, for the treatment of ordinary essential hypertension. This is not because they are not powerful; rather it is because they are too powerful or at least too generally powerful. Blocking, as they do, both sympathetic and parasympathetic impulses and indiscriminately at the autonomic ganglia, they usually produce such general and severe side effects that for continued long-term treatment they are too unpleasant to be feasible. Also, as better nonblocking antihypertensive agents are developed, some of which are suitable for producing dramatic decreases in blood pressure, even in "malignant" or encephalopathic hypertensive crises, there is less and less need to resort to the ganglionic blocking agents.

As one looks back over the development of antihypertensive drugs to this point and attempts to judge the significance and implications of their actions, the following impressions are gained:

1. All antihypertensive drugs, with the exception of chlorothiazide, appear to be "nonspecific" in that they cause similar hypotensive responses in normotensive and in hypertensive individuals.

2. Reduction of arterial pressure, even by such "nonspecific" agents, appears to be a beneficial, if not a life-saving, procedure in many hypertensive patients, particularly those with an accelerated phase of a "malignant" crisis.

3. Additive, if not synergistic, effects can be produced by combining antihypertensive drugs or by using them in combination with splanchnicectomy.

4. A tendency, if not an innate trait, to hypertension seems to exist in most hypertensive patients because almost uniformly they become hypertensive again when all therapy is stopped.

5. This trait or tendency apparently is the explanation for the mobilization of counteracting mechanisms to the hypotensive effects of drugs, and explains why the blood pressure overshoots when some of the drugs are suddenly stopped.

6. Although several drugs in combination or in larger doses may be necessary to lower a hypertensive's blood pressure to satisfactory levels, it is often possible after some months to maintain such lower levels on considerably less medication than was required to obtain them initially.

7. Serotonin may play a role in hypertension; but it is not clear whether and how the antihypertensive effects of reserpine, BAS, or iproniazid are connected with their effects on serotonin. This matter needs more study.

8. Ganglionic blocking agents are slowly being replaced in the drug treatment of hypertension except as a last resort in very critical or resistant cases.

9. For the usual ambulatory hypertensive patient, a persistent, long-term trial of conservative doses of Rauwolfia, veratrum, hydralazine, and chlorothiazide in combination, if and as necessary, will be reasonably successful.

10. High blood pressure of serious degree is harmful and can and should be moderated in almost every case. After rarer causes of hypertension (such as coarctation of the aorta, renal disease, and adrenal tumors with hyperadrenalism or hyperaldosteronism) have been ruled out, antihypertensive drug treatment should be given with determination to lower blood pressure gradually in every patient in whom the family history and the course of the disease indicate that a shortening of life or a period of invalidism is likely without treatment. (Wilkins, R. W., New Drugs for the Treatment of Hypertension: Ann. Int. Med., 50: 1-10, January 1959)

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Rubella During Pregnancy

Since 1941, when Gregg first reported the relationship between German measles (rubella) in the pregnant woman and the occurrence of congenital malformation in her offspring, the physician has been faced with the practical problem of management in the patient who has had known exposure to rubella during pregnancy or who develops clinical manifestations of this disease early in pregnancy. The rubella syndrome in offspring of women who have experienced German measles during pregnancy is well established and has been verified by a number of careful clinical studies. On the basis of Gregg's retrospective studies and those of some other observers, the

incidence of malformation seems extremely high. For example, Gregg reported an 80 to 90% incidence of congenital malformation where rubella complicated the first trimester of pregnancy; a 21 to 78% incidence following infection in the second trimester; and from zero to 20% in the third trimester.

Greenberg and associates have been interested for some time in the frequency of defects as evaluated by the prospective type of study. Recently, one group reported by them comprised 104 cases of maternal rubella occurring in the first three months of pregnancy; of these 104 cases, there were 48 in which therapeutic abortion was considered advisable; in 10 cases of the 104, it was not possible to follow the patient. In the remaining 46 cases, 28 mothers gave birth to normal infants; 12 mothers had spontaneous miscarriage; three infants were stillborn; and three infants developed congenital malformations: that is, three of 31 liveborn infants, or about 10%. At the Eighth International Congress of Pediatrics in Copenhagen in August 1956, Lündstrom reported extensive survey studies of the prospective type. His findings are in accord with those from other such studies, that is, malformations occurring after rubella infection in the first trimester of pregnancy in from 9 to 12%. In a control group of pregnant women comparable numerically who did not acquire rubella, the incidence of malformation was only 1.6%. On the basis of this unusually well-organized survey, risk of fetal damage from rubella contracted in the first trimester was estimated as a ratio of 6:1 as compared with that in uncomplicated pregnancy.

In spite of this reevaluation of the incidence of fetal damage, which has been the result of the prospective type of study rather than the retrospective approach employed earlier, the problem remains and is invariably a difficult one for the clinician to handle, requiring thoughtful consideration in each individual case.

A reevaluation of the rubella problem from the standpoint of prevention was attempted recently by Krugman and Ward whose interest in this subject has extended over a period of years. Equivocal results concerning the efficacy of gamma globulin in the prevention of rubella prompted these authors to study the levels of neutralizing antibody in ordinary gamma globulin, in convalescent rubella plasma, and in gamma globulin prepared from plasma of patients convalescent from rubella. In this unusually clear-cut study, a serum pool previously shown to contain active rubella virus was used as a basis for serum-virus neutralization tests in human subjects. Four groups of individuals with six in each group were inoculated intramuscularly with appropriate mixtures of active virus and serum: active virus from the original rubella serum pool plus normal human serum free from rubella antibodies; active virus plus ordinary gamma globulin; active virus mixed with convalescent-phase plasma; and a mixture of active virus with convalescent gamma globulin. In the group receiving active rubella virus plus normal human serum as inoculum, five of the six individuals developed clinical rubella. Of the group who received rubella virus plus gamma

globulin, one of the six developed clinical rubella; of the group receiving as inoculum a mixture of active virus and convalescent-phase serum, one of six developed rubella; and in the group receiving active virus plus rubella convalescent-phase gamma globulin, none of the six showed signs of clinical rubella.

These results show clearly the presence of neutralizing antibody to the virus of rubella in ordinary gamma globulin, in convalescent-phase gamma globulin and—under the conditions of this study—can be interpreted as indicating the relative efficacy of these preparations in the prevention of clinical manifestations of the disease.

With respect to the advisability of therapeutic abortion in women who develop clinical rubella during pregnancy, the conscientious physician is often faced with a difficult decision. As Krugman and Ward point out, this important decision must be based on many factors and each case must be carefully individualized. It would seem, on the basis of the statistical analysis by Dekaban and associates that in the very early weeks of pregnancy before the fourth week the fetus is extremely susceptible to serious damage from rubella infection in the mother and actually the damage may be done before the mother is aware that she is pregnant. Patients in this category would appear to be likely candidates for therapeutic abortion. From the sixth to the eighth weeks of gestation, the decision as to whether this therapeutic procedure is indicated could be answered in the negative more easily. Certainly, patients who develop rubella beyond the twelfth week of gestation would not be advised to terminate the pregnancy.

In general, the most satisfactory approach to the problem at present seems to be as follows: A woman in early pregnancy with no previous history of rubella who has known exposure to the disease should receive immune substance early and in large amount. In most parts of the world, the antibody-containing blood product readily available would be gamma globulin: dosage, 20 ml. intramuscularly. Convalescent-phase plasma or convalescent-phase gamma globulin are preferred to ordinary gamma globulin and should be used whenever they are available: approximate dosage, 10 ml. intramuscularly. The advisability of exposing young girls to rubella merits reiteration, especially because one attack of this benign disease of childhood is followed, as a rule, by durable immunity which will protect them throughout the childbearing period. Safe measures for active immunization against rubella, undeveloped as yet, would seem to offer a promising means of control in the future. Despite the general consensus that the risk of congenital malformation following maternal rubella is less than earlier estimates made some years ago would indicate, this risk is still a real one, often with tragic consequences for the individual and his family. Careful studies, such as those being reported currently, are of value in helping the clinician to make a wise decision. (Blattner, R. J., Rubella During Pregnancy: J. Pediat., 54: 257-260, February 1959)

Osteoporosis in the Elderly Patient

Osteoporosis, a generalized disease caused by a deficiency of bone substance, results when bone absorption is greater than bone formation. It is observed in generalized form in various conditions associated with excess bone dissolution, such as (1) Cushing's syndrome, (2) prolonged use of glucocorticoids in the treatment of arthritis, (3) acromegaly, and (4) postclimacteric and postmenopausal aging states.

This last type is a reflection of progressive loss of bone substance (catabolism) with an inadequate rate of formation of bone matrix (anabolism) and is universal in an aging population.

Osteoporosis is seen in its local form as disuse atrophy secondary to fracture and plaster fixation and in areas that have been irradiated by roentgen rays or by ultrasonic waves. It is dramatically observed in acute bone atrophy associated with reflex sympathetic dystrophy, so-called Sudeck's atrophy.

This article is limited to a consideration of that form of osteoporosis which occurs in the postmenopausal, postclimacteric, and senile states and which is based to a large degree upon deficiency of androgens and estrogens originating from gonads and adrenals.

The chief subjective complaint is pain, particularly in the back, which is usually mild at onset, but becomes more severe. Not infrequently, the pain is sudden and agonizing in onset. This usually accompanies vertebral body collapse from little or no trauma. The pain is radicular or girdle-like in distribution; it may be continuous and aching, but is usually burning and hyperesthetic, pulsing in an intermittent, wave-like fashion.

Aching pain is common, particularly at night and even on bed rest. In the older age group, pain on motion is often associated with hypertrophic arthritis and must be differentiated from pain at rest in evaluating reaction to treatment.

Weakness is frequent and may be of generalized type associated with loss of muscle tone as a reflection of protein deficiency. It may be localized, in which case it is usually observed in the lower extremities and is probably caused by spinal cord or nerve root pressure from collapsed vertebral structures.

Fatigue is excessive in these cases and it, too, is usually felt in the back before it is felt in the legs. Flushes, palpitation, nervousness, and apprehension are frequent and are associated with hormonal changes at the menopause or climacteric. Arthralgias and myalgias are common and accompany degenerative changes in bone and joints and, more importantly, loss of muscle tone.

Gradual loss of stature is frequently observed with increasing spinal deformities, such as dorsal kyphos and lumbar lordosis. The kyphos is by far the most prominent manifestation and the severe hunchback appearance

observed in advanced cases is a typical late effect. Osteoporotic bones are abnormally soft. Gradual resorption of both trabecular and cortical bone eventuates in an eggshell-type bone structure which may be crushed or broken with minimal trauma.

The areas most commonly affected are the vertebral column, the proximal femur, and the proximal humerus. Women in particular are subject to repeated fracture of the rib cage. Often these injuries are the clue to the diagnosis of osteoporosis.

Postmenopausal, postclimacteric, and senile osteoporosis are the result of a fault in matrix formation due to hormone deficiency in the aging individual and are further aggravated by a poor intake of protein, mineral, vitamin D and vitamin C.

Major conditions which must be considered in the differential diagnosis include osteomalacia, hyperparathyroidism, metastatic malignancy, multiple myeloma, and adrenal tumors, such as in Cushing's syndrome.

Current research on the basic anatomy, formation, and resorption has opened a challenging vista for the physician. He can treat not only the mechanical, but also the metabolic aspects of bone disease. Indeed, by fuller understanding of the basic physiology, he can apply proper prophylactic measures. For, after all, the best treatment of a fractured neck of the femur is to circumvent the underlying osteoporosis which so frequently predisposes to such a catastrophe. The authors believe that the physician must accept this challenge because the ever-aging population presents abundant clinical material upon which current therapeutic regimes may be evaluated and future techniques developed.

The preeminence of the orthopedic surgeon in mechanical matters is unchallenged, but osteoporosis is not a problem in mechanics alone. The medical aspects must be as familiar as the mechanical to the physician to insure the best care for the patient.

Treatment for osteoporosis requires hormonal and dietary replacement of a difficult sort. One method consists of constantly repeated balance studies on a patient on various regimes, but the time and expense precludes its use on a sizable number of patients. Blood chemical studies are relatively useless because they vary little from normal; hormonal excretion studies of the urine have too wide a fluctuation and hormonal blood levels are difficult to perform and have a considerable range of normal values. Use of radioactive-tagged hormones may have value, but requires extensive facilities for evaluation.

Experience has taught that properly used sex hormones are not dangerous and cause little concern regarding other side effects if a minimal effective maintenance dosage can be determined and settled upon. Androgens should not be used in cases of carcinoma of the prostate and estrogens are similarly contraindicated in the presence of uterine, ovarian, or breast malignancies. An exception is in proved nonestrogen-dependent breast carcinoma.

There are still other essential substances whose quantitative requirements cannot yet be given and which are often lacking in the usual diet of an aged person. Examples are vitamin C and trace minerals, such as magnesium. The authors prefer to administer these substances in such natural food sources as milk, cheese, meat, and citrus fruits rather than in tonic or pill form.

Therefore, it is logical to use hormones, vitamin C, and high protein intake for osteoid formation; calcium, phosphorus, and vitamin D for calcification of the matrix; citrus fruits for citric acid; and, if necessary, hydrochloric acid for an increase in calcium solubility. This, in essence, has been the authors' regime and is now followed by most other clinicians. (Stein I., Beller, M. L., Management of Osteoporosis in the Elderly Patient. Part I. Geriatrics, 14: 99-110, February 1959)

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Roentgen Diagnosis of Pulmonary Embolism

Evidence of pulmonary embolism is reported in 10 to 25% of necropsies. Although in many instances, embolism is an incidental finding or is only a contributory factor toward death, the clinical recognition of minor episodes of embolism is of practical importance because effective treatment is available which offers a means of preventing fatal massive embolism.

Unfortunately, in many hospitals and in office practice, pulmonary embolism frequently goes unrecognized. Clinically, embolic episodes are commonly misdiagnosed as pleurisy, pneumonia, and coronary artery disease. There are no pathognomonic symptoms and signs to indicate the correct diagnosis and no specific laboratory tests which may be used to establish the presence of thromboembolism. Electrocardiographic changes reflecting right heart dilatation due to acute pulmonary hypertension are frequently demonstrable if serial examinations are made; but the abnormalities are often misinterpreted as indicative of primary myocardial disease.

The importance of roentgenologic examination in the diagnosis of pulmonary disease and the key role which the radiologist has assumed in this field need little emphasis. It is evident from experience in many hospitals that the frequency with which pulmonary embolism is clinically diagnosed depends largely on the frequency with which the radiologist calls attention to the possibility of this disease.

The diagnosis of pulmonary embolism was made on the basis of clinical, laboratory, or necropsy findings in 90 patients at the Graduate Hospital of the University of Pennsylvania from August 1955 to January 1957. Thirty-three patients had embolism following surgery. An equal number entered the hospital as the result of pulmonary embolism. Of the 90 patients with embolism, 69 recovered from their illness and 21 died within the period of the

study. Nine of the deaths were due to pulmonary embolism; in the other fatalities, pulmonary embolism was merely contributory or incidental. Analysis of the clinical findings indicated that embolism produced predominantly pulmonary manifestations in 43% of the patients, cardiac manifestations in 37%, and abdominal syndromes in 7%. Neurologic and miscellaneous symptoms occurred in 13%. Clinical evidence of phlebitis was found in only 61% of patients, but the lower extremities were believed to have been responsible in all but a minority whose emboli were attributed to sources in the arms, heart, and abdomen. Significant electrocardiographic changes were observed in 71% of the 75 patients who had serial tracings. The high frequency of transient electrocardiographic abnormalities is especially remarkable because the episodes of embolism were often of moderate or slight severity.

Roentgenographic examination of the chest was secured following the onset of symptoms attributable to embolism in 72 patients. Roentgenograms were not secured in 18 instances either because the embolism was quickly fatal or because the diagnosis of pulmonary embolism was not suspected until necropsy was performed. The present study represents an analysis of the 72 cases with special emphasis on assessing the value of roentgenographic examination in the diagnosis of pulmonary embolism. The roentgenograms have been reviewed and compared with the original reports of these studies. The roentgen characteristics and distribution of lesions have been tabulated. Serial films, available in most surviving patients, provided an opportunity to measure the rapidity of clearing of the roentgen abnormalities.

As a result of widespread misconceptions regarding the clinical and roentgenographic manifestations of pulmonary embolism, in many hospitals this diagnosis is rarely made except in fatal cases. A striking increase in the frequency of diagnosis of pulmonary embolism in recent years at the Graduate Hospital has resulted from the collaboration of radiologists with other staff physicians especially interested in the disease who have utilized all clinical, electrocardiographic, and other laboratory aids in an effort to detect minor episodes of embolism.

A common cause of failure of the radiologist to suggest the diagnosis is his lack of familiarity with the varied changes in the chest roentgenogram which follow pulmonary embolism. The old concept that the roentgen diagnosis can be made only when one encounters a "wedge-shaped density with its apex directed toward the hilum" is hard to dispel even though the variable manifestations of pulmonary infarction have been frequently described.

In the authors' experience, the typical pattern of roentgen changes in the chest after embolism is: Moderate-sized homogeneous densities are observed in one or both lower lobes. Extension to a pleural surface is usually demonstrable and a small pleural effusion is commonly present. Linear densities resembling plate-like atelectasis are seen in the same or contralateral lung. Infarct shadows may resolve rapidly, but more often will clear gradually with development of one or more linear scars. In many

instances, the original roentgenographic study may be compatible with pneumonia; only when serial roentgenograms show characteristic changes will pulmonary embolism be suggested roentgenologically. Occasionally, a pulmonary infarct may be so well circumscribed that primary or metastatic neoplasm is simulated.

Although effusion is a common finding following pulmonary embolism, the effusion is usually small and of little clinical importance. Attention should be called, however, to the not infrequent instances in which pulmonary embolism is associated with a large effusion. These cases require differentiation from tuberculous pleurisy with effusion.

The roentgen diagnosis of infarct was suggested in 39 patients in the present series. Twenty-one patients had definitely abnormal findings described in the original report, but misinterpreted most commonly as pneumonitis (12 cases). Upon review of these roentgenograms for the purpose of the present report, the changes in all were considered to be consistent with pulmonary infarction. Thus, the important fact is not that the diagnosis was suggested in slightly more than one-half of the cases, but that there were changes present in more than 80% of the examinations which should lead to the correct interpretation by radiologists who are familiar with the roentgenologic and clinical manifestations of this common and important disorder.

The alert radiologist will consider pulmonary embolism in the differential diagnosis of every acute cardiorespiratory illness. He will suggest this as a possibility in all patients with pulmonary and pleural densities resembling pneumonia and pleurisy. Not infrequently, he will recognize characteristic roentgenographic patterns that will provide strong evidence for a diagnosis of pulmonary embolism even when typical clinical manifestations may be absent. (Stein, G.N., et al., The Importance of Chest Roentgenography in the Diagnosis of Pulmonary Embolism: Am. J. Roentgenol., 81: 255-262, February 1959)

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Conservative Management of Placenta Previa

From January 1954 to June 1957, 166 cases of placenta previa which occurred in 18,408 deliveries were studied as part of an over all fetal mortality evaluation at the U.S. Naval Hospital, Portsmouth, Va. This significant number of cases in a relatively short time permitted an evaluation of strict conservative management with (1) adequate amounts of readily available blood, (2) newer broad-spectrum antibiotics, and (3) recently improved radiological diagnostic techniques. Certain acceptable methods of diagnosis and treatment were found to have margins of error and dangers limiting their usefulness. To some physicians, conservative management means only a period of observation with specific plans to effect delivery by cesarean

section at the onset of the next bleeding episode when blood and operating facilities are more readily available; whereas, it should mean the prolongation of intrauterine gestation for the infant, support of the maternal circulation, and delivery at the time, and by the method, that best serve the interests of the mother and infant. Time permits a more accurate diagnosis and allows for selection of the optimum method of delivery, protecting the mother and the fetus in the current pregnancy and offering a better maternal prognosis for future pregnancies. These inherent benefits of conservative management have prompted this report.

During the 41 months' study, there were 18,408 deliveries on the Obstetrical Service in this Naval Hospital. All cases of bleeding after the 20th week of gestation were considered. The diagnosis of placenta previa in all cases was made by one or more of the following methods: (1) x-ray, either by soft-tissue technique or air cystograms; (2) sterile vaginal examination, usualiy with double setup; (3) visualization of the placental site at the time of cesarean section; and (4) visualization or palpation of the placenta through the dilated cervix at delivery.

The early onset of significant bleeding is the basis of the rationale for conservative management. Twenty-five patients were admitted to the service bleeding before the 30th week of gestation and another 25 were admitted before the 33rd week. Thus, one-third of all patients in the present series depended upon continued intrauterine gestation for increased fetal salvage. Twenty-one patients could have been delivered of previable fetuses, yet there were only 13 infants delivered weighing less than 1000 gm., and two of these survived. The 10 infants who lived must be considered salvaged primarily because their delivery occurred at a more advanced period of gestation.

The intermediate group (34 to 37 weeks) also has a better prognosis if delivery can be delayed at least until the maternal circulation has been stabilized; however, many of these patients are delivered shortly after admission because labor is well established and continuing blood loss threatens the fetus with anoxia.

The management of third-trimester bleeding consists of four distinct phases. The first is that rendered in the home: no rectal examination, no vaginal examinations, no packing, immediate hospitalization preferably by ambulance.

The second phase is undertaken at the time of admission to the hospital and includes: (1) abdominal examination noting rigidity, localized tenderness, station, and presentation; (2) bed rest and observation unless the bleeding is brisk and fails to abate and shock threatens; (3) typing and cross-matching for anticipated blood loss; (4) base line hemoglobin, hematocrit, and red blood count; (5) No. 18 needle in a vein with fluids running; (6) nothing by mouth (liquids and soft diet are not offered until bleeding has ceased for 24 hours); (7) fibrinogen levels (Schneider method) when abruptio placentae

is suspected, and smears for nucleated red cells if vasa previa is a possibility.

In the third phase of treatment, patients may be divided into two groups: (1) Those who continue to bleed and threaten to go into shock are examined under sterile double setup and delivered by the safest and most expedient method. (2) Those who stop bleeding under the regime outlined in phase two are evaluated by x-ray placentography after a short time interval (preferably after the 32nd week). Vaginal examinations are deferred when the x-ray is positive for, or highly suggestive of, placenta previa and unless the pregnancy is beyond 37 weeks. Patients are examined vaginally only when the period of gestation favors delivery in preference to observation (38 weeks) or when bleeding recurs necessitating the selection of a method of delivery. All patients with negative placentograms are examined vaginally, by speculum, and digitally, treated, and discharged.

The election of the method of delivery might be considered as the fourth phase of management. It is based on the condition of the cervix and the degree of placenta previa present. In the long closed cervix (characteristic of the nullipara), patients with total and partial placenta previa are usually delivered by cesarean section if near term. Low lying placenta previa is treated by artificial rupture of the membrane, allowing the presenting part to tamponade the placenta in the lower uterine segment. Failure of the presenting part to engage, as is common in low lying posterior placenta previa, is usually attended by excessive bleeding and cesarean section is essential. The short soft cervix (characteristic of the multipara) lends itself to vaginal delivery in partial placenta previa and low lying placenta previa once the membranes have been ruptured. All patients with total placenta previa and occasional patients with partial placenta previa who continue to bleed are delivered by cesarean section.

Ideally, (1) the maternal systolic blood pressure should be 90 mm. Hg or higher at the time of operation, (2) the placenta should be separated rather than perforated, (3) the cord should be clamped immediately following delivery, (4) blood counts should be taken on all babies and anemia treated early by transfusion, (5) all unnecessary intrauterine manipulation should be avoided, including manual removal of the placenta, (6) there should be prompt delivery once dilatation is complete, occiput posteriors rotated, and low forceps employed when spontaneous delivery is not imminent.

One hundred and sixty cases of placenta previa in 18,408 deliveries are presented and reviewed. The management is discussed in detail. Diagnostic aids, including x-ray and selective filtration techniques, and sterile vaginal examination are appraised for accuracy as well as for hazard to the patient. Methods of delivery are discussed including specific indications for abdominal delivery. Section rates more than 15% above the number of total placenta previas are believed to represent an easy but unwise solution for bleeding problems. Major complications associated with placenta previa and abnormal

presentations are mentioned. The choice of anesthesia for abdominal as well as vaginal delivery, especially in the face of circulatory instability, is discussed.

An additional month or more of continued intrauterine gestation for the infant was averaged in 22.3% of cases; 88% of the fetuses in this group were immature or premature by gestational age at the time of admission; 60% of the infants weighed over 2500 gm. at the time of delivery and an over all fetal survival rate of 89.1% was credited to this group of patients. Despite there being almost twice the number of total placenta previas in this group, the actual blood needs were 20% less than among patients who were in active labor and bleeding at the time of admission.

For an additional 11.5% of the patients, temporization permitted more accuracy in the diagnosis of the type of placenta previa present and the selection of a method of delivery which offered the infant and mother the best prognosis in the current pregnancy as well as in future pregnancies. (CDR J. P. Semmens MC USN, Placenta Previa - The Role of Conservative Management in a Controlled Study: Am. J. Obst. & Gynec., 77: 63-72, January 1959)

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Acute Cholecystitis

The management of acute cholecystitis is often a debated problem despite the vast amount of study which has been done. Most textbooks of surgery mention two courses of action: a conservative watchful waiting approach which is stirred from its complacency only by the clinical evidence of impending gangrene or perforation, and an aggressive early operation discipline. Because each hospital population differs with regard to age and physical condition, it should adopt the method dictated by its own experience. In order to do this, 134 consecutive cases of acute cholecystitis seen prior to 1958 were carefully reviewed. The results indicate that the best system is operation as early as possible, but commensurate with the time needed to make an accurate diagnosis and to place the patient in an optimal condition to withstand the operation.

The sex and age ratios of this population are similar to those of other studies of acute cholecystitis. Eighty-two patients (62%) were women; twice as many were men. This ratio was maintained in the various age groups. The youngest patient was 24 years of age, the oldest 91, and the mean age was about 52. Thirty-nine percent of the patients were over 60, and this group accounted for 71% of the deaths and 64% of the gangrenous or perforated cases.

The occurrence of acute cholecystitis in association with the treatment of unrelated diseases—especially their surgical treatment—has been well

stressed. Patients with gallstones who are hospitalized for unrelated disease are subject to many factors which could precipitate an attack: fasting diet, sphincter-contracting narcotics, dehydration, supine position, anesthesia, infection, fright, et cetera. In this series, acute cholecystitis developed during the treatment for pernicious anemia, leukemia, diarrhea, and pulmonary emphysema and asthma. It followed surgery in two cases, one a fulguration of a tumor of the bladder, and the other incision and drainage of an abscess in a diabetic patient.

Although the diagnosis of acute cholecystitis is obvious in most cases, there are many diseases which can mimic it. Many of these are surgical and an error is not so serious. In four or five cases, however, surgery is definitely contraindicated and may cause death. Therefore, every case demands study. Right upper quadrant abdominal pain, tenderness, and spasm do not always mean acute cholecystitis.

The preferred operation is cholecystectomy; but, whenever the patient's general condition is poor or when the pathological findings are too severe, cholecystostomy is performed. Eighty patients underwent cholecystectomy with four deaths (5% mortality), whereas thirty-three underwent cholecystostomy with nine deaths (27% mortality). As would be expected, this latter group of patients was older (70% over 60 years of age). The pathologic condition was more complicated (57% were either perforated, gangrenous, or empyemic) and there were more associated vascular diseases (37%).

A series of 134 cases of acute gallbladder disease are reviewed pathologically and clinically. From the pathological point of view, there is good evidence that gallbladders may be easily operated upon within the first 10 days of an acute attack and that the earlier this is done the less chance there is for subsequent perforations either by gangrene or infection.

An additional factor for early operation may be the prevention of an occasional case of B. coli septicemia which has an ominous significance. The majority of complications of gallbladder disease and deaths occur in the older age group or in those patients with associated disease. A more vigorous approach must be planned for this group.

The possibility of acute cholecystitis must be stressed in all patients with known biliary disease who enter a hospital for medical or surgical treatment. This may help to explain an occasional difficult diagnostic syndrome once therapy for the unrelated condition is begun. Cortisone must be added to the drugs to be feared in this regard.

Watchful waiting is difficult because there is a poor correlation between the signs and symptoms and the complications of gallbladder disease. Laboratory aids are of some value, especially if correlated with the patient's age and associated vascular disease.

Of particular significance is an elevated right diaphragm because, when it is present, it is associated with complicated gallbladder disease in a high percentage of cases.

The over all mortality rate was 12% and varied with the condition of the gallbladder and physical status of the patient. Early operation may control the condition of the gallbladder. Sufficient time must be taken before surgery to improve the physical status of the patient. (Byrne, J. J., Acute Cholecystitis: Am. J. Surg., 97: 156-169, February 1959)

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Synthetic Mesh in the Repair of Hernias and Tissue Defects

Hernias and tissue deficiencies are encountered which require the addition of a reinforcing or bridging material to obtain proper repair. The need for a satisfactory reinforcing material is attested to by the number of substances that have been used ranging from tissues, such as skin, fascia, dura, scar, cartilage, and bone to various types of metals and synthetic plastics. In the authors' experience, a pliable synthetic mesh with interlocked fiber junctures appears to serve as a satisfactory prosthesis when properly employed. It adds maximum strength with minimum foreign substance. In this report, certain applications and limitations of pliable, porous synthetic prostheses are presented based upon animal experiments and clinical experiences with 33 patients.

Because occasional hernias and deficiencies cannot be adequately repaired by using existing tissues, the search for a satisfactory reinforcing substitute continues. It is hoped that the ideal material may be developed from one or more of the increasing number of modern synthetic materials. From the authors' observations to date, there appear to be a number of advantages to the use of a reinforcing sheet of pliable plastic mesh with fixed interlocked fiber junctures. A porous mesh of the simple woven and braided type would seem to be less desirable than a knitted one in which the fiber junctures are fixed by interlocking so as to prevent slipping and unraveling.

In contrast to relatively impermeable substances, such as skin, fascia, preserved dura, and plastic sheets, serum cannot be trapped beneath the porous prosthesis. Fibrovascular tissue can grow through and incorporate the mesh in the tissues with which it has contact. Unlike the more rigid metallic meshes, however, projection through skin or erosion into an adjacent blood vessel or viscus has not been observed. The sites of fiber junctures do not appear to be subjected to the same forces of work fatigue that have been seen with the more rigid metallic meshes. The pliability of the synthetic mesh allows for better adaptation to the various stresses encountered in the body. In fact, the knitted type of mesh exhibits a degree of functional elasticity or stretch as the prosthesis is pulled in one direction and then another.

The mesh is made ready for use in surgery by routine sterilization in an autoclave. Its interlocked fiber junctures prevent slipping and distortion, allow it to be cut to any size or shape at surgery, and permit marginal suturing without need for a cuff to prevent unraveling. Another desirable feature is that the mesh may be safely placed in direct contact with abdominal and thoracic viscera when peritoneum and pleura are absent.

Regardless of the material or combination of materials eventually found to be most desirable, the essence of the matter appears to be that the mesh must be durable and maintain its tensile strength or it will have no value as a supporting prosthesis. One cannot depend upon scar tissue to take over the support if the prosthesis fragments or disintegrates; three of the incisional hernias that were encountered had recurred through areas of fragmented tantalum mesh despite the excessive deposition of fibrous tissue so commonly seen in response to implanted tantalum mesh. The advantages of a water repellent material that causes no tissue reaction are obvious and need no comment.

The problem of potential infection persisting around an implanted nonabsorbable material will probably remain no matter how inert the material may be. When it is really necessary to use a prosthesis, the aim should be to keep the amount of added foreign substance to the minimum needed for proper support. Earlier work with purposely induced infection in animals showed that the open mesh was well tolerated and primary healing frequently took place. If suppuration occurred, healing usually followed when the area was adequately drained despite the presence of the open mesh. This result was in distinct contrast to a closely woven, less porous, cloth-like fabric which acted as a foreign body fostering continued suppuration until the wound was widely opened and the fabric removed.

Clinically, the incidence of infection has been very low when the mesh was properly employed. The need for a satisfactory covering of skin and subcutaneous tissue in superficially implanted mesh was made apparent in the radical mastectomy patients. In this group, each instance of infection apparently had the common denominator of skin separation due to tension or ischemia which then exposed parts of the underlying mesh. Chronically draining sinuses did not provide proper drainage. Another factor promoting infection and interfering with proper healing was related to several operators' inexperience with the use of the mesh. This fact resulted in the mesh being loosely placed with redundant free edges protruding too far beyond the anchoring sutures. In two patients the infected wound was opened early so as to establish drainage; healing promptly followed. In these instances, the mesh was progressively incorporated in the granulating tissue as the wound closed.

In the postmastectomy infections with chronically draining sinuses, the wounds were opened and the entire mesh deliberately excised. In these cases, loose edges of wrinkled mesh were encountered, but the larger part of the mesh was imbedded in the underlying tissue. After removal of the mesh by

traction and sharp dissection, areas of mesh imprint could be seen on the underlying tissue.

One other factor deserving mention while discussing wound healing concerns the use of drains. Although all abdominal hernias healed well, it is the authors' impression that a temporary soft rubber Penrose drain would be advantageous in the immediate postoperative period when a large dead space remains after extensive dissection and mesh implantation, such as that seen following repair of recurring ventral hernias. Occasionally, small catheters with suction drainage may be indicated. Contaminated wounds should also be drained at the time of surgery, especially if the surgeon is compelled to use a synthetic prosthesis. (Adler, R.H., Firme, C.N., Synthetic Mesh in the Repair of Hernias and Tissue Defects: Surg. Gynec. & Obst. 108: 199-206, February 1959)

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Atrial Septal Defect

The authors' total experience with the open repair of interatrial septal defects of the so-called secundum variety is now somewhat in excess of 100 cases. In addition, 20 patients with pulmonary valvular stenosis associated with patent foramen ovale or atrial septal defect and a few others with septum primum or atrioventricularis communis have been treated. Because of the important differences in the pathologic anatomy and physiology which occur in the presence of these latter anomalies, it seemed wise to confine the subject of this report to a study of those patients who had some variant of the secundum-type lesion and who did not have pulmonary outflow obstruction. This article concerns the first 100 consecutive patients recommended for surgery and proved to fit into this category at open-heart operation.

The embryology of the atrial septum has been so well described by Rokitansky and by Patten that the terminology has been universally adopted. In the latter's opinion, the septum secundum defects result from either normal development of the septum secundum with excessive resorption of the valvula foraminis ovalis, or arrest in the development of the septum secundum with failure to reach the caudal margin of the ostium secundum. A further degree of classification would have some clinical merit if it helped the surgeon to understand the variations of the anatomy encountered. Kirklin, Lewis, and Bedford and co-workers have discussed this problem. The authors' classification is in general agreement with all three authors, but differs from other systems in distinction between so-called "primum" defects and atrioventricularis communis. This classification is:

I. Interatrial Septal defect, Secundum
   A. Foramen ovale defects
      1. Foramen ovale open; due to defect in valvula foraminis ovalis which may be partially present as a caudal or dorsal margin or as a fenestrated membrane.

2. Valvula foraminis ovalis absent; lower margins apparently continuous with valve of inferior vena cava; anomalous pulmonary venous drainage may be associated wiht this defect.

B. Septum Secundum Defects (high)

These defects are situated immediately inferior to the entrance of the superior vena cava; they usually have no cephalic or dorsal margins; they are often associated with anomalous return of pulmonary veins from the right lung to the right atrium or superior vena cava, or with anomalous pulmonary venous return from the left lung into a left superior vena cava and/or a coronary sinus.

C. Combined Defects

II. Interatrial Septal Defect, Primum

These defects which are very rare are situated in the lower portion of the septum; there is no inferior margin above the upper edge of the ventricular septum, but also there is no defect or cleft in either of the atrioventricular valves.

III. Atrioventricularis Communis

1. The atrioventricular cushion is intact and the "ventricularis" part of the defect consists of a cleft in a mitral or tricuspid leaflet.
2. A frank defect in both septa is present.

During fetal life, the presence of an atrial septal defect places no increased burden upon the circulation as the normal blood flow passes from right atrium to left. Following birth, a left-to-right shunt at this level is prevented by the closure of the foramen ovale. However, if a considerable atrial septal defect is present, the two ventricles fill from a common source and what complement of blood each receives depends on the resistance to filling which each offers.

Thus, at birth, the heart size in such a situation is normal; it is rare for a patient whose sole malformation is an atrial septal defect to die in the first year of life. At birth, moreover, the right and left ventricles are of about equal muscular development and the pressures in the systemic and pulmonary circuits are about equal. As time goes by, however, there is a fall in pulmonary vascular resistance and a rise in systemic resistance. Concomitantly, the muscular development of the left ventricle comes to exceed that of the right and the resistance to ventricular filling likewise becomes greater on the left side. Thus, it is easy to understand the gradual increase in the left-to-right shunt through the atrial septal defect as the resistance to passage of blood into right ventricle and pulmonary circuit becomes significantly less than that into left ventricle and aorta. This change occurs relatively slowly during the first year of life and the circulation is able to adapt itself to the derangement of hemodynamic pattern. The right ventricle

and pulmonary artery pressures fall and the normal regression of the fetal pulmonary vascular pattern takes place.

Accordingly, the patient with an atrial septal defect usually does very well in the first year of life and rarely is the diagnosis made at this time. A further factor that may operate in this period is that, as the right atrium dilates, the atrial septal defect probably increases in size, further augmenting the left-to-right flow. Most patients with this lesion have little in the way of symptoms during the first decade and often the second as well. Frequently, however, they begin to note the development of symptoms in the third decade of life consisting of insidious fatigue and dyspnea on exertion.

Early in the experience of this center, when the surgical risk was higher and complete cure in doubt and with the knowledge that the defect is relatively benign as compared with other congenital heart defects, there was a natural hesitancy in advising operation. However, this has changed. Confidence has increased as it has become increasingly apparent that this is a low-risk operation—there has not been one operative death in the last 57 patients. Furthermore, postoperative catheterization data have shown that the procedure is curative and observation of the patients after surgery reveals what benefits can come to them. While the outlook is, on the whole, relatively good, for a patient with an atrial septal defect, it is nevertheless true that the mean life expectancy is not much over 37 or 38 years. At present, the diagnosis of the uncomplicated lesion in patients under 40 years of age is sufficient to be a firm indication for its surgical correction. Even in the very young age groups, surgery is strongly advised even though the patient is entirely asymptomatic. The authors believe that if an atrial septal defect is obliterated before the age of 8 years, the patient has an excellent chance of having a normal cardiovascular system by the time he grows into adulthood. It is also considered that what risk is present is less in the younger age groups.

The real decision is when not to advise surgery; at times, this can be very difficult. The obvious patient to whom surgery must be denied is the one whose pulmonary resistance is so high that the interatrial shunt is balanced or reversed. The value of surgery lies in closing the defect and abolishing the increased pulmonary blood flow. In such a patient, surgery does not help and the operative risk is high. In general, it is true to say that with increasing pulmonary vascular resistance the benefits derived from surgery decrease while the risk of surgery increases commensurately. Precisely where the dividing line should be drawn is not easy to decide. However, in cases with a high pulmonary vascular resistance, a pulmonary blood flow of no more than one liter higher than the systemic should raise serious doubts as to the advisability of surgery.

Atrial septal defect secundum is a congenital malformation which can be diagnosed clinically with great accuracy and which can be successfully treated surgically by open operation during hypothermia at a very low risk.

Operation should be performed on essentially all patients with this disease during childhood as soon as convenient after the diagnosis is made. (Swan, H., et al., Atrial Septal Defect, Secundum - An Analysis of One Hundred Patients Undergoing Open Surgical Repair: J. Thoracic Surg., 37: 52-78, January 1959)

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Alice Hamilton, M. D.

It is a major achievement to arrive at the age of ninety as hale and hearty as is Dr. Alice Hamilton today and as vitally interested in everything that is going on in the world. It is also a major achievement to be so deeply loved and admired by all of her many friends and professional colleagues. But major achievements are expected and accepted from Alice Hamilton as an inseparable part of her colorful life.

As a pioneer in the field of industrial hygiene, she has become a glowing symbol of the fondest aspirations, many of which owe their early beginnings to her crusading zeal, her vision, and her distinguished scientific achievements. As a pathfinder and educator, she has provided many guideposts to illuminate the road and these have helped to give direction to the evolution of this relatively new branch of public health—one which is still in its infancy, but which is now dramatically riding the wave of the future. Much has been written about these pioneering efforts.

Dr. Hamilton was most fortunate both in this country and abroad in having had the opportunity to study under leading medical scholars: Simon Flexner, William Osler, W. J. Howell, William Welch, and others of similar stature. In her modest autobiography, Exploring the Dangerous Trades, is revealed a woman of original mind and warm personality capable of creating as well as profiting fully by her exceptional opportunities. It is a fascinating story, delightfully written. Every one should read it.

For Alice Hamilton, industrial hygiene has always been only one part of the larger field of medicine, particularly that of public health.

It must be heartwarming to Alice Hamilton to see the field of industrial hygiene expanding beyond the prevention of health hazards in industry to include all occupations and all aspects of occupational health; to see the growing interest in plant medical services and medical care directed toward the prevention of disease and the promotion of optimum health and well being. It must be gratifying to her, also, to see the many professional disciplines which are now cooperating in a common effort toward these goals—engineers, chemists, physicists, physiologists, statisticians, psychologists, nurses, nutritionists, as well as many specialized branches of medicine; to see the extent to which the laboratory is contributing not only to a quantitative evaluation of occupational exposures in terms of safe dosage, but to the early

detection and correct diagnosis of the occupational diseases; to see the extent to which management, government, and labor are working with these technical groups to translate their data into practical realities.

In none of her field studies for the U. S. Department of Labor, which took her back and forth across the country many times, did she have any legal authority to enter plants, Nor did she have legal powers of enforcement. Against seemingly insuperable obstacles, however, she got things done by sheer force of personality and tireless dedication to her cause. The ball which she started rolling has been gaining momentum ever since. She is very modest in recording how, in time, she was called into consultation with increasing frequency by industrialists and others to assist in the solution of industrial hygiene problems—problems which might still have gone unnoticed—had she not persevered in spreading enlightenment wherever she went. Years later she revisited many of these plants and was gratified to see the strides that had been made.

In 1919, Alice Hamilton was given the great honor of being appointed assistant professor of industrial medicine at Harvard. The break with tradition in appointing a woman to the faculty seemed incredible at that time, and she recalls some amusing limitations with which the appointment was hedged: she must not insist on her right to use the Harvard Club; she would not demand her quota of football tickets, et cetera. In 1935, Harvard "made me a Professor Emeritus which was a great honor and pleasantly ignores my sex."

During the years, Alice Hamilton has continued to keep in close touch with industrial hygiene both here and abroad and has been frequently called upon as a consultant. In 1935, for example, she was medical consultant to Frances Perkins, then Industrial Commissioner in New York State. In 1937, she made her study on carbon disulphide poisoning in the rayon industry; and in 1938, she read a paper on the subject in Germany at a meeting of the International Congress of Occupational Accidents and Diseases. In 1939, she revised her Industrial Toxicology. She is always ready to "put in one more hour" when others would call it a day.

Dr. Alice Hamilton is one of America's great women. It is with deep emotion that she is honored on her ninetieth birthday. (Mayers, M. R., "Alice Hamilton, M. D." - Am. Indust. Hyg. A. J., 19: 449-452, December 1958) (OccMedDispDiv, BuMed)

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Health Hazards and Control of Epoxy Resin Operation

The epoxy resins are strong and resilient plastics that have interested engineers since they first appeared in 1950. Thermosetting and heat-resistant, these plastics when cast and heat-cured are especially useful in

applications requiring resistance to shock and vibration. They are also—unfortunately—somewhat toxic, because tertiary and tetra-amines released during the uncured or wet state cause allergic reactions in almost all personnel exposed. The epoxy resins are, therefore, an industrial hygiene problem of some importance; a problem that, unless nontoxic hardeners are developed, can be expected to increase as these resins come into wider and wider use.

The first indication of toxicity occurred in January 1951 and appeared as an inflammation of the eyes and forearms of a plastics shop employee. In the procedure used at that time, the plastic was poured over fiberglass, formed on a solid mold and, if necessary, was smoothed with the hand. This procedure had been used for a number of years with polyester resins with only occasional cases of dermatitis, primarily because of carelessness while handling cleaning solvents. Therefore, the inflammation was diagnosed initially as no more than a contact condition and the employee was temporarily withdrawn from work on plastics. Recurrence of the condition when the employee returned—even though he cooperated fully in avoiding contact—was the first suggestion that epoxy resins were hyperallergens and thus an industrial hygiene problem. Plastics' shop personnel were advised to adhere to the following precautionary program: (1) put on clean coveralls each morning and observe extreme personal cleanliness; (2) keep hands out of the solvents being used to clean tools or spills (contact with plastic solvents is believed to be responsible for most of the allergies); (3) wash hands with soap and water if uncured material is touched; (4) take showers at the end of the shift; (5) cover the floor or work benches with heavy butcher paper wherever the uncured material is being mixed or handled; (6) wear rubber gloves during all wet lay-up operations; and (7) do not smoke or eat in the area where lay-ups are being made.

Further alleviation of the problem was also sought through improvements to ventilation in the plastics shop which at the time was small and crowded. However, it was found that exhaust air was largely overbalanced by supplied air, and, therefore, eddying and draft could not be prevented. Because work on epoxy resins was thought to be exploratory only and probably temporary, approval could not be obtained for a program to improve ventilation and other working conditions.

As one after the other of the plastics' shop personnel became sensitized, it became clear that personal hygiene and care in handling were not adequate to prevent dermatitis. Although some improvements were made to the ventilation and personnel cooperated fully, the allergies continued—not by direct contacts, but by fumes of the amines given off by the wet plastic. The allergies also tended to cause a sensitization to the formerly innocuous polyester resins. As the volume of epoxy resins production increased, almost two-thirds of the personnel became sensitized. Drastic action was precipitated when an order for some very large shapes

was received. The shop was closed pending the procurement of adequate space and ventilation. Approval for a new area with much more space and much better facilities was obtained. Setting up the new area afforded an opportunity to plan operations with industrial hygiene requirements fully in mind. One of the principal design considerations was separation of operations in which fumes are evolved from those in which the dry plastics only were handled. This design was undertaken for two reasons; (1) uncured material could be confined to areas where special exhaust and handling equipment was available, and (2) the area where dry material only was handled would provide an area in which personnel who had become sensitized could still work. This arrangement permitted the retention of several workers who would otherwise have had to be transferred.

A second design consideration was adequate ventilation. The exhaust system had a total capacity of about 60,000 cubic feet per minute. An input system with a capacity of 50,000 cubic feet per minute provided makeup air to replace that exhausted. This makeup air is supplied through the overhead ducts. One change to the exhaust system was made after completion. With exhaust blowers located near the input to the duct, duct pressure was greater than room pressure and any leakage in ductwork resulted in pumping of amine fumes back into the shop over a period of time. Blowers were relocated near the outlet so that negative duct pressure was maintained.

The major feature of the area in which wet plastics are handled is the waterwall. This area is 15 feet deep from the water tank to the outer edge of the hood. Exhaust capacity is 24,000 cubic feet per minute. All mixing and wet lay-up are done in this area. The workers wear surgical gloves taped to their coverall sleeves to insure that hands and arms do not come in contact with the plastic; goggles and safety glasses need not be worn. When there is no possibility of splashing of solvent or plastic, wet lay-up may be carried out without these safety devices which are required elsewhere on all machining and chemical operations. It had been noted that inflammation and irritation from epoxy resins were worse when these safety devices were worn, apparently because of the concentration of fumes behind the safety glasses of face shields.

Because cleanup of resin spills leads to inadvertent contacts, cleanliness in the area is essential. In the waterwall area, it is advised that butcher paper be used under the mold and that the plastic film floor covering be scraped off and replaced at least once a month.

In the new facilities, a 50-ton press in which some curing operations are carried out, requires an exhaust system. Because the top bed of the press moves up and down, flexible ductwork is required. The press had to be further modified by the addition of sheet-metal panels to restrict the flow of air to the immediate area around the plastic.

A downdraft table with a rotating top was utilized. In addition to the flow of air through the top grate, air may be drawn across the work when

the square panel in the front of the unit is removed. Baffles are provided in this outlet so that the downdraft flow is not stopped when the panel is removed.

After the above mentioned improvements were completed, no cases of sensitization occurred in the plastics' shop. The few cases that have occurred were the result either of carelessness in handling or of working in areas that were not approved.

In summary, work with the epoxy resins suggests the following recommendations:

1. High standards of both personal and work-area cleanliness must be maintained. The work area must be kept free of spills; when spills do occur, they must be cleaned up immediately.
2. Personnel should be made well aware of effects of the material with which they are working. The industrial hygienist and the plastics' shop supervisor are responsible for keeping personnel educated in the characteristics of the material.
3. Both the industrial hygienist and the supervisor should be able to recognize the early symptoms of sensitization. Personnel with these symptoms should report immediately to the industrial physician because early diagnosis and treatment are important.
4. In a large plant or laboratory, personnel outside the plastics'shop must be made aware by industrial hygienists of the potential hazards of the epoxy resins and warned not to begin small operations with these plastics without adequate safeguards. This information and other industrial hygiene information should be distributed plantwide in industrial hygiene bulletins.

Although proper industrial hygiene practices come close to eliminating the epoxy resins as a health hazard, an even more helpful approach is the substitution of low-toxicity aliphatic amines for the toxic agents. It is indicated that the hydroxyalkyl hardeners do not cause sensitization. Progress in this area may some time reduce or eliminate the problem. Until that time, however, the epoxy resins must continue to warrant the attention of the industrial hygienist. (Kingsley, W.H., Health Hazards and Control of an Epoxy Resin Operation: Am. Indust. Hyg. A. J., 19: 258-265, June 1958)

(OccMedDispDiv, BuMed)

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Deaths Due to Entering Void Spaces

Deaths continue to occur among Naval personnel due to entering confined spaces which lack sufficient oxygen or which contain excessive amounts of air contaminants.

The latest incident occurred aboard a ship while conducting salvage operations. The man entered a gasoline tank containing approximately six feet of water to shift an eductor. He was overcome and fell into the water and died before he could be removed.

The following precautionary measures are reemphasized:

1. No person shall enter any closed compartment or poorly ventilated space in any naval or Navy operated vessel unless and until a "gas free" certificate for such compartment or space has been issued by the safety engineer or other authorized person. This shall certify that the danger of poisoning or suffocation of personnel, or the danger of ignition or explosion of inflammable gases has been eliminated or reduced to the lowest practical minimum by the use of adequate mechanical ventilation.
2. Any person entering a void space in which there is the slightest chance of poisonous gas or lack of oxygen shall be required to (1) wear an approved rescue breathing apparatus; (2) attach a safety line to himself; and (3) maintain direct communication with someone outside.

All shipboard medical department personnel are advised to check precautions presently being practiced aboard their ships. It is imperative that all personnel be reindoctrinated as to precautions which must be observed in entering void spaces. (Occupational Health Engineering Branch, OccMedDispDiv, BuMed)

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From the Note Book

1. The reappointment of Rear Admiral B. W. Hogan MC USN as Surgeon General of the Navy and Chief of the Bureau of Medicine and Surgery for a period of two years was confirmed on February 6, 1959, by the U. S. Senate. The new two-year term will extend Admiral Hogan's tenure of office as Head of the Navy Medical Department to February 15, 1961. (TIO, BuMed)

2. "Navy Submarine Reactors from a Medical Point of View," was the topic of a lecture given on February 9, 1959, by Captain H. J. Alvis MC USN before more than 150 students of the Army's Medical Service Officer Advanced Course at Brooke Army Medical Center, San Antonio, Texas. Captain Alvis is Director of the Submarine Medicine Division at the Bureau of Medicine and Surgery. (TIO, BuMed)

3. The 1959 All-Navy Photography Contest will be held by the Chief of Naval Personnel in May 1959 and the Interservice Photography Contest will be held by the U. S. Marine Corps as the host in the Pentagon Building during June '59.

All military personnel on active duty for 90 days or more are eligible to enter. (BuPers Notice 1700, 5 December 1958)

4. Twenty-two Navy and Marine officers and civilian personnel graduated from the Navy's first motor vehicle and traffic safety course February 20, 1959 at the Traffic Institute, Northwestern University, Evanston, Ill. The Navy representatives came from six states, the District of Columbia, Hawaii, and Puerto Rico. Among the subjects in the 100-hour course were: Accident Causes, Investigation, Reconstruction, and Analysis; Use of Accident Record Data; Motor Vehicle Administration; Traffic Engineering; Driver Improvement through Education, Traffic Law Enforcement - Police and Courts, and the Military Traffic Safety Program. (Traffic Institute, Northwestern University)

5. Research Highlights of the National Bureau of Standards, Annual Report, 1958, highlights research and development programs for fiscal year 1958 at the National Bureau of Standards. It describes a wide range of scientific studies, laboratory experiments, instrument developments, and technical publications. (N. B. S., Dept. of Commerce)

6. The number of reported cases of infectious hepatitis released for the week of 6 February 1959 was 574. For the comparable week last year, the figure was 375 and the median figure for 1954-58 was 543 cases. The cumulative number of cases for the 4 weeks of 1959 is 63% higher than the figure for the comparable 4 weeks of 1958. The increased incidence is evident in all the geographic divisions. The largest percentage difference between 1958 and 1959 figures is for the West North Central Division, but also the New England, Middle Atlantic, East North Central, South Atlantic, Mountain, and Pacific Divisions have substantially larger figures for 1959. Except for several occasional weeks, since July 1958 the number of cases reported each week has consistently exceeded the figures for the comparable week of the previous year. So far in 1959, the weekly figures have been close to the median figures for the period 1954-58. Although the largest number of cases has been reported in the Pacific Division, that area's percentage of the total for the Nation is less than it was in 1958. (PHS, HEW)

7. Of a total of 1,250 gastric lesions, there were 708 (57%) in which the diagnosis was originally in doubt. Those cases of resectable carcinoma that originally appeared to be benign ulcerations proved to have a better prognosis than the resectable carcinoma group as a whole. All available methods of diagnosis, including repeated x-ray examinations, gastroscopic and cytologic studies, and tests of free hydrochloric acid secretion, should be employed as needed in the study of an apparently benign ulcer under conservative medical management in order to minimize the risk of temporizing with a gastric carcinoma. (Ann. Int. Med., January 1959; G. C. Hennig, M. D., H. D. Harvey, M. D.)

8. Eight percent of 395 men with hemoptysis had primary bronchogenic carcinoma. Only 6 of 32 cancer patients were living 1 to 5 years after their hemoptysis. Hemoptysis is probably a late symptom of untreated bronchial cancer. (Geriatrics, February 1959; K. R. Boucot, M. D. et al.)

9. A study of 969 cases of perforation, hemorrhage, or obstruction of peptic ulcer discloses that nearly 10% of these patients have more than one of these entities at the same time and that such complications produce a mortality 4 times as great as cases with only one such complication. (Am. J. Surg., February 1959; S. W. Moore, M. D., F. W. Fuller, M. D.)

10. Experiences with open intracardiac repair for the tetralogy of Fallot are described, with details concerning the factors contributing to hospital and late mortality. The operation, perfusion, and postoperative management must be done with precision if the best results are to be obtained. (J. Thoracic Surg., January 1959; J. W. Kirklin, M. D., et al.)

11. This report results from a continuing study of anemia in obstetric and gynecologic patients and summarizes the observations. It deals particularly with the use of parenteral iron in these patients. Am. J. Obst. & Gynec., January 1959, J. A. Pritchard, M. D.)

12. This article reviews the experience with malignant lymphomas seen at Duke University Hospital between 1930 and 1952 and emphasizes the curability of such lesions. (Surg. Gynec. & Obst., February 1959; J. W. Frazer Jr. M. D.

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Third Annual Naval Dental Research Conference

The third Annual Naval Dental Research Conference will be held the day before the meeting of the International Association for Dental Research, 18 March 1959, at the Sheraton-Palace Hotel, San Francisco, Calif. The purpose of the conferences is the exchange of information among Naval personnel engaged in dental research. The following topics will be discussed:

Cdr M. A. Mazzarella DC USN	Microbiology of Dental Plaque Material
LtCdr G. H. Green DC USN	Manometric Studies of Metabolic Factors in Saliva of Caries-Rampant and Caries-Immune Recruits
Dr. I. L. Shklair	Microbiological Studies of the Oral Cavity with Special Reference to Pleuropneumonia-Like Organisms.

Dr. T. B. Weber	Physiochemical Properties of Parotid Secretion
Cdr H. W. Lyon DC USN	Long-Term Host Response to Anorganic Bone Implants
Dr. R. Van Reen	Current Studies of Dietary Influences on Caries in the NMRI-D Rat
Capt C. A. Ostrom DC USN	Bacterial Antagonism in Experimental Caries
Dr. R. U. Laurila (Biochemist)	Isolation and Characterization of Fluorescent Material in Teeth
Miss S. A. Mancewicz (Biochemist)	Infrared Spectroscopic Investigation of Teeth and Bone
Cdr P. J. Boyne DC USN	Observations on the Clinical Use of Anorganic Bone
Capt R. B. Wolcott DC USN	The Bainbridge Programs of Research in Dental Caries
Mr. S. W. Gilkerson (Bacteriologist)	Antigen-Antibody Study of Parotid Saliva and Certain Oral Antigens
Capt W. R. Stanmeyer DC USN	Study of Oral Health in Personnel Living in Unnatural Environments
Capt Louis Hansen DC USN	Biologic Effects of High-Speed Instruments
Capt M. G. Wheatcroft DC USN	Results of Postgraduate Research Studies
Mr. Lee Brown (Microbiologist)	Investigations into the Production of in vitro Dental Caries
Capt C. E. Meyers DC USN	The Host Factor and Identification Program of Naval Medical Research Unit No. 1, Naval Biological Laboratory, University of California
Mr. H. Wolochow (Bacteriologist)	Persistence of Inhaled, Non-Pathogenic Organisms in the Oropharyngeal Region of Humans
Mr. G. Hildebrand (Physiologist)	Investigation of the Oral Absorption of Botulinus Toxin
LtCdr P. Griffith MSC USN	Identification of Bacteria in Specimens from Various Sources in the Antarctic

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Use of funds for printing this publication has been approved by the Director of the Bureau of the Budget, 19 June 1958.

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SUBMARINE MEDICINE SECTION

What Price Folly?

In an attempt to set a record for depth and least consumed time in a dive off the California coast, a 22-year old skin diver recently caused no little anxiety to his parents and friends about his chances to live, and brought the Coast Guard, Army, and Navy to his rescue. This was the fifth time within a year that an amateur diver had been treated in the same chamber for a diving casualty.

With some friends interested in setting a record, it was decided by a flip of a coin this "lucky" fellow would get the honor. He donned his scuba, grabbed a 40-pound weight and slid down a line until he reached a marker at 350 feet which he brought back to the surface. The elapsed time was reported as 7 minutes and 35 seconds. He was complaining of joint pain and cramps as he was assisted back into the boat and shortly thereafter lost consciousness. Then common sense began to prevail. Cries of help brought a Coast Guard lifeboat to the scene to ferry the patient ashore. An Army helicopter speeded this ferry operation to a Naval Air Station where a medical officer estimated the patient's condition as critical. The helicopter then took the patient to another naval station having a recompression chamber. At this point, the patient came into the hands of one of the pioneers in submarine medicine - CAPT A. R. Behnke. After several hours of recompression, he was able to swallow some liquid nourishment.

Comment: The final result in a case like this may not be known for months. Although no mention is made in the newspaper accounts of any paralysis being present, one may expect it in such circumstances. There comes a point where one cannot separate the symptoms and signs due to the physical insult and the residuals caused by the edema following the initial trauma. This diver was lucky he received such prompt aid and came into such good hands so soon. But what of the expense involved in caring for this young man? What if there had been no chamber available, or operators for the chamber, or a knowledgeable doctor? All these services may be charged against the patient according to a Comptroller's ruling. They are not a trivial sum. Common sense diving practices are not only safer, but much cheaper.

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DENTAL SECTION

Twelve Dentists Selected for Regular Navy

A Naval Examining Board recently selected twelve candidates from more than forty applicants for appointment in the Regular Navy Dental Corps. Selectees are:

LT Meredith S. Burch DC USNR - FASRON 12
LT John M. Driscoll DC USNR - MCS, Quantico, Va.
LT Glenn E. Hamme DC USNR - 2nd DentCo., 2nd MarDiv.
LT Edwin E. McDonald DC USNR - NAS, New orleans, Va.
LT Robert E. Moore DC USNR - Charleston Navy Shipyard
LT Jerome A. Smith DC USNR - USS Bon Homme Richard
LT Charles G. Strange, Jr., DC USNR - MCS, Quantico, Va.
LT William E. Sugg, Jr., DC USNR - NAS, Jacksonville, Fla.
LT Robert E. Timby DC USNR - USS Midway
LT Ernest T. Witte DC USNR - Muscatine, Iowa
Dr. James T. Clynes, Gueydan, La.
Dr. Henry A. Stallworth, Marion, Ala.

The next meeting of a Board to consider applications for appointment in the Dental Corps, U. S. Navy is scheduled to convene during August 1959.

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Repair Contract for High Speed Equipment

A contract has been negotiated with the Midwest Dental Manufacturing Company for the repair of higher speed belt driven handpieces manufactured by that company. A letter, dated 10 February 1959, from Chief, Bureau of Medicine and Surgery to all ships and stations having Dental Corps personnel, contains pertinent information regarding the contract and its implementation.

In the past, the unpredictability of cost to repair this type of handpiece has been a problem to field activities. By this contract, repair costs were established which will permit development of definite budgetary targets for future expenditures. The contract becomes effective 1 March 1959.

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RESERVE SECTION

Statements of Satisfactory Service and Retirement Points for Enlisted Reservists

The Chief of Naval Personnel has recently authorized procedures to permit enlisted Reservists to obtain statements of creditable service completed for Naval Reserve retirement. Naval Reservists who complete a minimum of 20 years Satisfactory Federal Service as defined in Article H-31305, BuPers Manual are eligible for retirement. Upon attaining age 60 they become eligible for retired pay based on years of Satisfactory Service and the number of retirement points earned during years of participation.

Accordingly, enlisted Naval Reservists who entered the Naval Service prior to January 1954 may obtain a statement of retirement points earned and years of Satisfactory Federal Service through individual letter request submitted to the Chief of Naval Personnel via the Command having possession of the Reservist's current service record. In forwarding the request the Commanding Officer shall indicate in his endorsement the date from which the service record contains authentic entries of retirement points and satisfactory years of Federal Service. Also, if contained in the service record all pages 10, Record of Training Duty, NavPers 601 and pages 11, Drill Attendance Record, NavPers 601 shall be forwarded. The page(s) 11, Record of Naval Reserve Service, NavPers 601, shall not be forwarded.

The Chief of Naval Personnel will furnish statements of creditable service in duplicate. The original will be filed in the service record and retained therein during subsequent enlistments. The duplicate copy is to be given to the individual. (Ref: BuPers Notice 1822, 26 January 1959)

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Cardiovascular Pathology Seminar

A Cardiovascular Pathology Seminar will convene at the Armed Forces Institute of Pathology, Washington, D. C. from 6 - 10 April 1959.

This course is designed primarily for pathologists, clinicians, and surgeons interested in acquired and congenital heart disease and peripheral vascular disease. The material will be presented by specialists in cardiovascular diseases and will consist of lectures and discussions utilizing lantern slides and selected films. The following subjects will be covered:

embryology, anatomy, physiology, conduction system and chemistry of the heart, congenital heart disease, rheumatic heart disease, periarteritis, thromboangiitis obliterans, Buerger's disease, arteritis of the aorta, thrombotic thrombocytopenic purpura, erythema nodosum, erythema induratum, nodular panniculitis, migratory thrombophlebitis, hypersensitivity, traumatic heart disease, and tumors and cysts of the heart.

Applications from U. S. Navy Medical Department officers on active or inactive duty will be forwarded at the earliest practicable date through channels to the Chief, Bureau of Medicine and Surgery, Department of the Navy, Washington 25, D. C. Priority will be given to officers who are board certified, board qualified, or residents in a specialty related to the course desired.

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Convention of National League for Nursing

The Convention of the National League for Nursing will convene at the Hotel Bellevue Stratford, Philadelphia, Pa., from 11-15 May 1959.

Inactive Naval Reserve Nurse Corps officers may earn one retirement point credit for each of the five convention days provided they attend the following lectures which will be marked on the official program by an asterisk and also register with the military representative present.

The topics chosen for each day, in keeping with the convention theme, "Nursing for a Growing Nation," are:

Monday, May 11, 1959, 9:30 - 11:30, a.m.: Ballroom, Bellevue Stratford, "Using Research Findings in the Evaluation of Nursing Performance."

Tuesday, May 12, 2:00 - 4:00 p.m., Auditorium, Convention Hall, "Studies Which Contribute to the Understanding of Patients and Nursing Personnel in Relation to Patient Care in Federal Hospitals and the Implications of Findings in Relation to Civilian Hospitals."

Wednesday, May 13, 2:00 - 4:00 p.m., Auditorium, Convention Hall, "The Patient Care Unit as a Reflection of Hospital Structure."

Thursday, May 14, 2:00 - 4:00 p.m., Auditorium, Convention Hall, "Baccalaureate and Higher Degree Programs in Nursing - Are the Graduates Meeting Present Day Needs?"

Friday, May 15, 9:00 - 11:00 a.m., Auditorium, Convention Hall, "Releasing Human Resources."

In addition to the professional meetings, all Regular and Reserve Nurse Corps officers are invited to attend the Navy Nurse Corps breakfast on May 13, 1959 at 0800 in the Green Room, Hotel Bellevue Stratford, Philadelphia, Pa. Tickets may be purchased ($3.00) at the Navy Nurse Corps booth or the Convention Hall ticket office.

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PREVENTIVE MEDICINE SECTION

Community Trials of BCG Vaccination

Although BCG was first administered to a human subject in 1921, its use during the next 25 years was based largely on results of laboratory studies and clinical experience gained from vaccinating highly exposed children and young adults. In the United States, little interest in BCG developed until the appearance in 1945-46 of reports of three studies which embodied some of the features now considered essential for adequately controlled trials. In two of these studies, much less tuberculosis among vaccinated than unvaccinated subjects was reported. Other investigators could find no effect of vaccination on tuberculosis mortality. At about the same time, interest in BCG was stimulated by the rapidly expanding Scandinavian programs which were soon to culminate in the international mass campaigns sponsored by UNICEF and the World Health Organization.

Meanwhile, in 1946 in the United States, an advisory committee to the Surgeon General of the U. S. Public Health Service had expressed the view that the evidence was not sufficient to justify extensive use of BCG in this country and recommended that the Public Health Service undertake controlled trials in different kinds of population. In line with these recommendations, several trials were planned by the Tuberculosis Program of the Public Health Service. These trials were to be strictly controlled and designed to avoid at least some of the deficiencies of earlier studies. A system of allocation was to be used which would insure the similarity of a vaccinated and an unvaccinated control group, and every precaution would be taken to avoid bias. Tuberculin reactors, although not considered eligible for vaccination, would be included in the study population. By observing the number of new cases of tuberculosis

appearing among the reactors as well as among the vaccinated and controls, it would be possible to determine how much of the total amount of tuberculosis could have been prevented by vaccinating all nonreactors. Large numbers of persons living under various conditions would be followed for a sufficient period of time to obtain information on both the immediate and long-range effects of vaccination.

In 1947, after exploratory studies among selected groups in Georgia and Michigan, four controlled trials were undertaken. To test the value of BCG for selected "high-risk" groups, one trial was started among patients of Ohio mental institutions and a second trial among American Indian school children. A third trial was started among children aged 1 to 18 in Puerto Rico, where tuberculosis has long been a serious problem. To test the usefulness of BCG in a general population in the United States, a fourth trial was begun on persons more than 5 years of age in a community formed by Muscogee County, Ga., and Russell County, Ala., where the tuberculosis problem is similar to that found in many other communities. The progress of these two community trials during the first 6 to 7 years of follow-up observation is summarized.

Summary

Controlled community trials of BCG vaccination were initiated and directed by the Public Health Service in Puerto Rico and in Muscogee and Russell Counties. More than a quarter of a million persons were placed under study: 112,000 tuberculin reactors, and 144,000 nonreactors who were allocated by a random scheme to vaccinated and control (unvaccinated) groups. For the identification of new cases of tuberculosis appearing in the study populations, the established medical, public health, and vital statistics reporting systems were deliberately chosen as being sufficient for the purposes of the study and, also, as being more likely to yield unbiased information than systematic periodic examinations. Certain policies and techniques were adopted as safeguards against the introduction of bias in the diagnosis and reporting of cases.

The most remarkable finding of both trials was that the risk of developing tuberculosis was much greater for persons who were tuberculin reactors on entry than for those who were nonreactors. Of the total number of cases that appeared during the follow-up period, 75% were among reactors; consequently, only the 25% of the cases that would have appeared among the initial nonreactors could have been prevented if vaccination had been completely effective.

Tuberculosis case rates among nonreactors were low. In Puerto Rico, the rate was 43 per 100,000 per year among controls and 30 among vacinees. The difference, representing 31% fewer cases among the vaccinees than among the controls, is statistically significant. In the Muscogee-Russell trial, the corresponding rates were 22 among controls and 14 among vaccinees, but the difference (36%) is not statistically significant. If all nonreactors had been vaccinated, the total number of cases in the study populations would have been

reduced by 8 to 9%—an estimate obtained by applying a reduction of 31 to 36% to the 25% of the cases which would have appeared in those who could have been vaccinated.

The low case rates among nonreactors can be directly attributed to the present low risk of acquiring new infections. Evidence of low and falling infection rates in this country is found both in the present trials and in other studies. Because BCG cannot help those who are already infected, nor those who will not become infected, and may be helpful only to a portion of the decreasing few who will become infected in the future, it is apparent that vaccination cannot be very useful in controlling tuberculosis in this country. Moreover, with the rapid decline in tuberculous infection, the tuberculin test is becoming increasingly more valuable for epidemiologic, case-finding, and diagnostic purposes. These uses of the tuberculin test are destroyed by vaccination with BCG which makes it virtually impossible to identify the naturally infected persons. And, as those who are already infected are now the group at greatest risk, it is upon them that tuberculosis control activities should be focused if the disease is to be eradicated. The position is taken that in most situations in this country the advantages of vaccination are outweighed by the disadvantages. (Palmer, C. E., Shaw, L. W., Comstock, G. W., Community Trials of BCG Vaccination: Am. Rev. Tuberc., 77: 877-907, June 1958)

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Human Ear Invasions by Adult Scarabaeid Beetles

The unusual occurrence of 186 cases of adult June beetles (Scarabaeidae) entering the ears of sleeping boys was observed at the Boy Scout Jamboree at Valley Forge State Park, Pa., in July 1957. Published reports of a similar nature are rare. In 1936, H. C. Hallock mentions adult beetles invading ears and impairing hearing through ear drum injury. In 1951, C. L. Metcalf, et al. stated that adult annual white grubs (Ochrosidia villosa Burmeister) "have occasionally caused personal injury by burrowing in the external ear of sleeping persons."

The majority of the 52,580 Jamboree participants slept on the sodded ground in two-man tents, the remainder used cots. During the first two nights of the encampment, all ear invasions were by the northern masked chafer (Cyclocephala borealis Arrow). The Asiatic garden beetle (Autoserica castanea Arrow) began to appear on the third night and subsequently was the only species involved. C. borealis is about 10 mm. long and 6 mm. wide while A. castanea is slightly smaller. Information obtained from the U. S. Department of Agriculture indicates that A. castanea and C. borealis have been distributed widely in the northeastern United States since 1936. These data give no indication of regularity in yearly cycles of abundance.

Observations indicate that low populations are associated with preceding summers of deficient rainfall.

The presence of a beetle in the ear canal was extremely painful because the tibial spines pierced the delicate skin of the canal as the beetle forced its way in, generally so deeply it could not be seen without an otoscope. Removal was likewise accompanied by considerable pain and slight bleeding. The effects apparently were transitory with very few cases of secondary infection.

Most cases occurred between 11:00 p. m. and 1:30 a. m. However, a small number did occur near sunrise. The groupings were related to the late evening emergence of the beetles from the turf and their return at daybreak. With two exceptions, in which beetles flew directly into the ears of boys standing in lighted areas, all boys were sleeping on the ground when the invasions occurred. No cases were reported in persons sleeping on cots.

The cases were widely distributed occurring in various parts of the camp on different nights. The number of cases was related to the general beetle abundance "at light." Night temperatures ranged from 59 to 80° F. Fewer cases occurred on the coolest nights, but the relationship with temperature at other times was inconsistent.

Emergency control measures were considered after the occurrence of 51 cases on a single night. Because insecticidal treatment of over 25,000 two-man tents and 1200 acres of turf in the camping area was impractical, mechanical means, such as cotton ear plugs or neckerchiefs tied about the head to cover the ears, were recommended to exclude the beetles from the ears. Data were insufficient to evaluate the effectiveness of the preventive measures. (Maddock, D. R., Fehn, C. F., Human Ear Invasions by Adult Scarabaeid Beetles: J. Economic Entomology, 51: 546-547, August 1958)

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Storage of DDT and DDE in People

The storage of DDT (dichloro-diphenyl-trichloro-ethane) and of DDE (dichloro-diphenyl-dichloro-ethylene) in people varies according to their dietary and occupational exposure. Analysis of ten samples of human fat collected and sealed before the advent of DDT in this country failed to develop a color typical of DDT or any known metabolite. Although some of the samples produced yellowish or brownish colors, the spectrophotometric readings did not exceed the readings taken on reagent blanks processed at the same time, but without any fat tissue. Thus, data which will be presented elsewhere indicate that, under conditions now in use, the lipids

extracted from human adipose tissue actually reduce the amount of light-absorbing material passing through a Davidow column. In any event, the results confirm the conclusion that human fat does not spontaneously contain any material which might be confused with DDT in the Schechter-Haller reaction.

During 1954-56, samples of fat tissue from 227 people were analyzed for DDT and DDE and the results tabulated according to the dietary, environmental, and occupational exposure of these people to DDT. Also, 45 samples of fat from those surveyed as well as 70 samples of fat and other tissues from 17 other people were used for other purposes. Thus, 342 samples in all were analyzed.

There has apparently been no progression in the storage of DDT in the general population of the United States since this storage was first measured in 1950. Persons abstaining from meat deposited in their fat only about one-half the concentration of DDT (2.3 p.p.m.) as did people in the general population (4.9 p.p.m.). Meatless meals served in a cafeteria catering to meat abstainers contained only about a quarter as much DDT as did meals served in ordinary restaurants.

There is strong evidence that essentially all storage of DDT and DDE in persons without occupational exposure results from the presence of these compounds in the diet, especially, but not exclusively, in fats of animal origin.

The environmental exposures incidental to living or working in or near areas of heavy application of DDT caused deposits only slightly greater than those in persons without such environmental exposure.

People with occupational exposure stored more DDT-derived material than other people and the rate of storage was generally proportional to the intensity and frequency of exposure.

DDE averaged 58% of the DDT-derived material stored in most people, however, a smaller proportion was stored in those with very great exposure. This finding is explained at least in part by the fact that about one-third of the DDT-derived material in the ordinary diet is preformed DDE. (Hayes, W.J., Jr. et al., Storage of DDT and DDE in People with Different Degrees of Exposure to DDT: A.M.A. Arch. Indust. Health, 18: 398-406, November 1958)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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Policy

The U. S. Navy Medical News Letter, is Basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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